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ATTACHMENT F – FACT SHEET

As described in Section II of this Order, this Fact Sheet includes the legal requirements and technical rationale that serve as the basis for the requirements of this Order.

I. PERMIT INFORMATION

The following table summarizes administrative information related to the facility.

WDID	5A342000006
Discharger	Aerojet-General Corporation
Name of Facilities	ARGET, GET E/F, GET H, Interim GET H, GET J, GET K, Interim GET K, GET L, GET L1, Sailor Bar Park Well
Facility Address	Aerojet Road
	Sacramento, CA 95813-6000
	Sacramento County
Facility Contact, Title and Phone	Chris Fennessy, Project Manager, (916) 355-3341
Authorized Person to Sign and Submit Reports	Gerald Swanick, Director Environmental Operations, (916) 355-3558
Mailing Address	P.O. Box 13222, Sacramento, CA 95813-6000
Billing Address	P.O. Box 13222, Sacramento, CA 95813-6000
Type of Facility	Groundwater Extraction and Treatment Facilities
Major or Minor Facility	Major
Threat to Water Quality	2
Complexity	B
Pretreatment Program	Not Applicable
Reclamation Requirements	Not Applicable
Facilities Permitted Flow	32.57 million gallons per day (mgd)
Facilities Design Flow	Not Applicable
Watershed	American and Sacramento Rivers
Receiving Water	Buffalo Creek, Morrison Creek, American River, Alder Creek, Sailor Bar Park Pond
Receiving Water Type	Stream and Pond

- A. Aerojet-General Corporation (Aerojet) operates a rocket testing and chemical manufacturing facility on 8500 acres in eastern Sacramento County. In order to address groundwater pollution beneath and beyond the Aerojet property, Aerojet has constructed many groundwater extraction and treatment facilities (GETs). GETs covered under this permit are on both Aerojet-owned property and property leased by Aerojet. Aerojet is responsible for maintaining compliance with this Order and is responsible for the Facilities' operations and discharge to surface waters
- B. The Facilities discharge to Buffalo Creek, drainage canals, Alder Creek and Sailor Bar Park Pond, all tributary to the American River, and to Morrison Creek, tributary to the Sacramento River, waters of the United States. The Facilities are both existing facilities regulated by a

Regional Water Board Order and new facilities that are not currently regulated by a Regional Water Board Order.

- C. The Discharger submitted a Report of Waste Discharge (RWD), dated 11 April 2005, and applied for a National Pollutant Discharge Elimination System (NPDES) permit authorization to discharge up to 32.57 mgd of treated groundwater from the Aerojet GET facilities. Supplemental Information was received on 28 April, 12 May and 15 May 2005.

II. FACILITIES DESCRIPTIONS

The Facilities are found both on and off Aerojet's 8500 acres in eastern Sacramento County, approximately 17 miles east of downtown Sacramento, in and around the City of Rancho Cordova, Sacramento County, as shown in Attachment B.

According to the Discharger's RWD, the Facilities treat extracted groundwater primarily containing volatile organics (VOCs) and/or perchlorate and/or n-nitrosodimethylamine (NDMA). These pollutants originated, for the most part, from historical rocket-testing and chemical manufacturing operations on the Aerojet site.

The groundwater the Facilities extract contains solvents consisting primarily of VOCs, such as trichloroethylene (TCE), chloroform, vinyl chloride (VC), 1,2-dichloroethylene (1,2-DCE), 1,1-dichloroethylene (1,1-DCE), and tetrachloroethylene (PCE), perchlorate, n-nitrosodimethylamine (NDMA), and 1,4-dioxane. Various treatment methods are used to reduce the pollutants down to acceptable levels prior to discharge

A. Description of Wastewater and Biosolids Treatment or Controls

1. VOCs can be easily removed from the extracted groundwater using a variety of treatment processes. Aerojet uses air-stripping, carbon adsorption (GAC), and ultraviolet or ozone oxidation in different combinations to remove the VOCs. At GET facilities that have high concentrations of VOCs Aerojet uses ultraviolet oxidation or oxidation using ozone, along with hydrogen peroxide, to destroy a majority of the VOCs, utilizing air stripping or GAC to remove residual VOCs. For lower concentrations of VOCs, GAC alone is utilized. Spent GAC is trucked to a permitted destruction facility.
2. Perchlorate is removed from the extracted groundwater using either biological reduction or ion-exchange. Biological reduction is performed by growing bacteria on carbon or sand in a fluidized bed reactor. Ethanol is injected into the influent to provide food for the bacteria. The bacteria will remove oxygen and nitrate prior to destroying the perchlorate. Biosolids are generated as bacteria material is removed from the system. The biosolids are collected on sand filters and the filters periodically backwashed. The backwash water proceeds through a clarifier to remove the solids prior to discharge. The solids collected in the clarifier and trucked to the sanitary sewer and the supernatant off of the clarifier is returned to the treatment process. The ion-exchange process uses a perchlorate-specific ion exchange resin that is disposed of when the resin's capacity for taking up perchlorate is

exhausted. The resin is then replaced with fresh resin and the spent resin taken to a permitted disposal facility.

3. Removal of NDMA is accomplished using ultraviolet light oxidation in combination with hydrogen peroxide.
4. ARGET Facility. The American River Study Area (ARSA) treatment system is on the Aerojet site. The facility was constructed in 1997 and originally consisted of ultraviolet/peroxide treatment to reduce concentrations of volatile organic compounds (VOCs) and 1,4-dioxane, and air-stripping to remove any remaining VOCs. This facility has been shown to remove VOCs to below detection levels ($0.5 \mu\text{g/L}$) and 1,4-dioxane to below its detection level ($2\text{--}10 \mu\text{g/L}$). This facility is designed to treat up to 3500 gallons per minute (gpm). Aerojet is modifying the VOC-removal portion of the facility to utilize ozone/hydrogen peroxide to remove the chlorinated ethene VOCs and 1,4-dioxane at a lower cost than the ultraviolet light system. Treatment for removal of low concentrations of perchlorate may be added in the future as the flow from new extraction wells are brought to the facility and the influent concentrations of perchlorate increase.
5. GET E/F Facility. The GET E/F facility is also on Aerojet property. GET E and GET F were originally constructed in the mid-1980's and were subsequently combined into one facility in 2000. The combined facility uses biological reduction to remove perchlorate, ultraviolet light/hydrogen peroxide to destroy NDMA and most of the VOCs, and air stripping to remove the remainder of VOCs from up to 6000 gpm of influent. There is also a sand filter and clarifier for solids control. The solids from the clarifier are discharged to the sanitary sewer under a permit. The treatment process has been shown to be effective in removing VOCs to below detection levels ($0.5 \mu\text{g/L}$), perchlorate to below $4 \mu\text{g/L}$, and NDMA to below detection ($0.002\text{--}0.0075 \mu\text{g/L}$). Testing of the influent and effluent to the treatment facility for full-scan analysis, including tentatively identified compound analysis, did not indicate additional contaminants of concern.
6. GET H Facilities. The interim GET H facility is found on Reserve Drive in Rancho Cordova. It treats up to 1500 gpm using resin-adsorption to remove perchlorate to less than $4 \mu\text{g/L}$, and granular activated carbon (GAC) to remove VOCs to less than $0.5 \mu\text{g/L}$. The interim system has been expanded to include a second temporary treatment system on Reserve Drive with the same outfall location. The long-term GET H system, currently being designed and constructed, utilizes the same treatment methods, but will treat a greater flow of extracted groundwater, approximately 4450 gpm. The long-term GET H system is anticipated to be on-line by January 2006 and will be in the north-central section of Mather Field. The interim facility has shown to be able to consistently meet effluent limitations.
7. GET J Facility. The GET J system is similar to GET H, but with the addition of ultraviolet treatment for the destruction of NDMA to less than $0.002 \mu\text{g/L}$ and particulate filtration to help the ultraviolet system. The system is designed to treat 4950 gpm and is found on Pyrites Way in Gold River. The GET J facility has shown to be capable of consistently meeting effluent limitations.

8. GET K Facilities. The interim GET K uses ion-exchange (resin bed adsorption) to remove perchlorate and GAC to remove VOCs from an influent of 400gpm. The long-term GET K system, anticipated to be operational in summer of 2006, will add ultraviolet light and particulate removal for treatment of NDMA to the ion-exchange and GAC treatment units, and treat approximately 3250 gpm. The interim GET K facility is on Zinfandel Drive and the long-term facility will be near Haggin Park, both in Rancho Cordova. The interim facility will be decommissioned when the long-term facility becomes operational. The interim GET K facility has consistently met effluent limitations.
9. GET L/L1 Facilities. GET L is currently being designed and constructed and will be in Carmichael, near Ancil Hoffman Park. The facility will initially treat for NDMA using ultraviolet light. If, in the future, VOCs and/or perchlorate are determined to be approaching the extraction wells in the groundwater, VOC and/or perchlorate treatment will be added utilizing the same processes described above. Flow to the plant, anticipated to commence operation in 2006, is 1080 gpm. A satellite treatment system, GET L1, will likely be constructed in order to reduce pipeline lengths from extraction wells to GET L. A portion of the extracted flow would be sent to GET L1 for processing using the same type of treatment as GET L. The total treated flow remains the same.
10. Sailor Bar Park Facility. The Sailor Bar Park system provides for removal of VOCs by GAC on a water supply well that is used to maintain the water elevation in the pond on Sailor Bar Park. The flow through the treatment plant is intermittent and is a maximum of 250 gpm. The park is on the north side of the American River adjacent to the village of Fair Oaks.
11. Chettenham Facility. Aerojet is currently negotiating with California American Water Company (CalAm), owner of the Chettenham Well, to use the Chettenham Well on an interim basis as an extraction point to control a portion of the groundwater pollution. Wellhead treatment consisting of ion exchange for perchlorate removal would be installed on the well and the discharge would be to the Boyd Station Channel. If the Chettenham Well will not be used for control of the plume, a dedicated extraction may be constructed and the extracted groundwater piped to the GET H treatment system. The Chettenham Well currently contains no pollutants requiring treatment to meet effluent limitations. The well may be operated without treatment for a period of time prior to Aerojet committing to adding treatment as the upgradient GET J system may be providing sufficient plume containment to protect the Chettenham Well.
12. Groundwater Extraction Well Aquifer Test Water. After construction of an extraction well Aerojet will perform an aquifer test on the well for up to 10 days. The purpose of the test is to provide information that will allow design of a GET system for treatment of water generated by an extraction field. The aquifer test water is passed through a portable treatment system designed using the type of treatment systems described above to remove the suspected pollutants. Under the previous permit, Aerojet was able to meet consistently meet effluent limitations with the portable system.

B. Discharge Points and Receiving Waters

1. Treated groundwater is discharged from Discharges 001, 002 and 005 (respectively, ARGET, GET E/F, GET J) to Buffalo Creek (tributary to the American River). Discharges 003 and 004 (Interim GET H and GET H) are to Morrison Creek (tributary to the Sacramento River). Discharges 006 (Interim GET K) 007 (GET K), 008 (GET L), 009 (GET L1) and 011 (Chettentham Well) are to drainage channels to the American River between the Sunrise Boulevard and Watt Avenue overcrossings. Discharge 010 (Sailor Bar Park) is to a pond in Sailor Bar Park, with a potential for overflow to the American River. Sacramento County requested during development of the previous permit to allow for the potential discharge from some or all of the GETs covered in this permit to Alder Creek and/or the Natomas Stilling Basin, to assist in their reuse of treated groundwater. The previous permit and this permit included a provision allowing for the discharge to Alder Creek/Natomas Stilling Basin pending completion of an acceptable study of the potential thermal impacts on Alder Creek/American River. In addition, in the future the County may pipe the GET H discharge (004) to the Boyd Station Channel in order to better accommodate reuse projects for the water.

C. Summary of Existing Requirements and Self-Monitoring Report (SMR) Data

1. Effluent limitations/Discharge Specifications contained in the existing Order for discharges from Discharge Point 001 and representative monitoring data since July 1998 from the term of the previous Order are as follows:

Parameter (units)	Average Monthly	Maximum Daily	Highest Average Monthly Discharge	Highest Daily Discharge
1,4-dioxane (µg/L)	3	10	<3	<3
Perchlorate (µg/L)	4	8	<4	<4
Copper (µg/L)	11	17	29	29
N-nitrosodimethylamine (µg/L)	0.002	0.005	0.001	0.0023
Trichloroethylene (µg/L)	--	0.5	0.7	1.4
1,2-Dichloroethane (µg/L)	0.38	0.5	0.25	0.45
Lead (µg/L)	15	2.5	1.3	2.7
Acetaldehyde (µg/L)	--	5	5.0	7.0
Formaldehyde (µg/L)	--	50	30	36
Zinc (µg/L)	110	100	21	42

2. The RWD and Aerojet Monitoring describe the discharges as follows:

<i>ARGET</i>		
<u>Constituent</u>	<u>Units</u>	<u>Maximum Daily</u>
Flow	mgd	5.4
pH	Standard Units	7.8-8.3
COD	mg/L	<3
Total Suspended Solids	mg/L	<6

ARGET

<u>Constituent</u>	<u>Units</u>	<u>Maximum Daily</u>
Chlorides	mg/L	15
Sulfate	mg/L	12
Manganese	mg/L	0.02
Aluminum	mg/L	<0.030
Iron	mg/L	<0.040
Zinc	mg/L	0.020
Arsenic	mg/L	<0.002
Lead	mg/L	<0.005
Hardness (as CaCO ₃)	mg/L	130
Barium	mg/L	0.07
Copper	mg/L	0.027
Chromium	mg/L	<0.002
Nickel	mg/L	<0.005
All VOCs	mg/L	<0.0005
Perchlorate	mg/L	0.007

GET E/F

<u>Constituent</u>	<u>Units</u>	<u>Maximum Daily</u>
Flow	mgd	8.64
pH	Standard Units	7.2-8.2
COD	mg/L	<3
Total Suspended Solids	mg/L	<6
Chlorides	mg/L	6.6
Sulfate	mg/L	15
Manganese	mg/L	0.07
Aluminum	mg/L	<0.050
Iron	mg/L	0.050
Zinc	mg/L	<0.050
Arsenic	mg/L	<0.002
Lead	mg/L	<0.002
Hardness (as CaCO ₃)	mg/L	110
Barium	mg/L	0.1
Copper	mg/L	<0.003
Chromium	mg/L	<0.002
Nickel	mg/L	<0.005
All VOCs	mg/L	<0.0005
Perchlorate	mg/L	<0.004

GET H/CHETTENHAM WELL

<u>Constituent</u>	<u>Units</u>	<u>Maximum Daily</u>
Flow	mgd	6.39
pH	Standard Units	7.6-7.8
COD	mg/L	<3

ARGET

<u>Constituent</u>	<u>Units</u>	<u>Maximum Daily</u>
Total Suspended Solids	mg/L	<6
Chlorides	mg/L	4.4
Sulfate	mg/L	3.3
Manganese	mg/L	0.07
Aluminum	mg/L	<0.050
Iron	mg/L	<0.050
Zinc	mg/L	<0.050
Arsenic	mg/L	<0.002
Lead	mg/L	<0.002
Hardness (as CaCO ₃)	mg/L	53
Barium	mg/L	0.046
Copper	mg/L	<0.003
Chromium	mg/L	<0.002
Nickel	mg/L	<0.005
All VOCs	mg/L	<0.0005
Perchlorate	mg/L	<0.004

GET J

<u>Constituent</u>	<u>Units</u>	<u>Maximum Daily</u>
Flow	mgd	7.17
pH	Standard Units	6.8-7.6
COD	mg/L	<3
Total Suspended Solids	mg/L	<6
Chlorides	mg/L	6.6
Sulfate	mg/L	15
Manganese	mg/L	0.07
Aluminum	mg/L	<0.050
Iron	mg/L	0.050
Zinc	mg/L	<0.050
Arsenic	mg/L	<0.002
Lead	mg/L	<0.002
Hardness (as CaCO ₃)	mg/L	160
Barium	mg/L	0.18
Copper	mg/L	<0.003
Chromium	mg/L	<0.002
Nickel	mg/L	<0.005
All VOCs	mg/L	<0.0005
Perchlorate	mg/L	<0.004

GET K

<u>Constituent</u>	<u>Units</u>	<u>Maximum Daily</u>
Flow	mgd	7.17
pH	Standard Units	7.7-7.8
COD	mg/L	<3

<u>Constituent</u>	<u>Units</u>	<u>Maximum Daily</u>
Total Suspended Solids	mg/L	<6
Chlorides	mg/L	4.4
Sulfate	mg/L	3.3
Manganese	mg/L	0.07
Aluminum	mg/L	<0.050
Iron	mg/L	0.050
Zinc	mg/L	<0.050
Arsenic	mg/L	<0.002
Lead	mg/L	<0.002
Hardness (as CaCO ₃)	mg/L	110
Barium	mg/L	0.110
Copper	mg/L	<0.003
Chromium	mg/L	<0.002
Nickel	mg/L	<0.005
All VOCs	mg/L	<0.0005
Perchlorate	mg/L	<0.004

GET L/L1

<u>Constituent</u>	<u>Units</u>	<u>Maximum Daily</u>
Flow	mgd	1.56
pH	Standard Units	6.4-9.0
Chlorides	mg/L	6.4
Sulfate	mg/L	7.1
Manganese	mg/L	0.07
Aluminum	mg/L	<0.005
Iron	mg/L	0.050
Zinc	mg/L	<0.050
Arsenic	mg/L	<0.002
Lead	mg/L	<0.002
Hardness (as CaCO ₃)	mg/L	110
Barium	mg/L	0.18
Copper	mg/L	<0.003
Chromium	mg/L	<0.002
Nickel	mg/L	<0.005
All VOCs	mg/L	<0.0005
Perchlorate	mg/L	<0.004

D. Compliance Summary

ARGET, GET E/F, GET H, GET J and Sailor Bar Park Well discharges have been in substantial compliance with effluent limitations since the inception of the discharges from those facilities. There have been two detections of TCE in the GET E/F effluent at slightly above the effluent limitation of 0.50 µg/L (maximum 0.8 µg/L). These excursions were not verified by follow-up sampling by Aerojet or Regional Board staff. Other effluent limitation excursions were for exceedances of the daily maximum effluent limit for copper for the

ARGET effluent. Twice in the past two years copper has been detected at up to 29 µg/L (limit of 17 µg/L). The effluent limitation does not allow for dilution in the receiving water. There have been no violations of receiving water limitations for any of the discharges.

E. Planned Changes

As stated above in Sections II(A) and II(B), Aerojet will be eliminating the two temporary GET facilities, Interim GET H (Discharge 003) and Interim GET K (Discharge 007), and replacing them with a larger facilities at new locations, GET H (Discharge 004) and GET K (Discharge 008) during the life of this permit. A treatment facility may be constructed on the Chettenham Water Supply Well (Discharge 011), the Chettenham Well may be operated without treatment, or a dedicated extraction well will be constructed near the Chettentham well with the extracted water being treated at GET H. This decision on whether or not to operate the Chettenham well should happen in the near future. In addition, in order to more easily reuse the treated groundwater, Sacramento County may redirect Discharge 004 to the Boyd Station Channel for ultimate discharge to the American River. The County is developing a plan for reuse of the treated groundwater and will develop the necessary CEQA documents. Revision of the permit will necessary prior to taking Discharge 004 to the Boyd Station Channel. The County may also redirect the discharges from ARGET and/or GET E/F to the Natomas Stilling Basin or Alder Creek. Prior to doing so, a thermal impact study will need to be completed that demonstrates that there are no adverse impacts with discharging to the new location(s). The CEQA document will evaluate the thermal impacts.

III. APPLICABLE PLANS, POLICIES, AND REGULATIONS

The requirements contained in the proposed Order are based on the requirements and authorities described in this section.

A. Legal Authorities

This Order is issued pursuant to section 402 of the Federal Clean Water Act (CWA) and implementing regulations adopted by the U.S. Environmental Protection Agency (USEPA) and Chapter 5.5, Division 7 of the California Water Code (CWC). It shall serve as a NPDES permit for point source discharges from this facility to surface waters. This Order also serves as Waste Discharge Requirements (WDRs) pursuant to Article 4, Chapter 4 of the CWC for discharges that are not subject to regulation under CWA section 402.

B. California Environmental Quality Act (CEQA)

This action to adopt an NPDES permit is exempt from the provisions of the California Environmental Quality Act (Public Resources Code Section 21100, et seq.) in accordance with Section 13389 of the CWC. The Department of Toxic Substances Control certified a final Negative Declaration and Initial Study for the American River Study Area project in accordance with CEQA and State CEQA Guidelines. The Board has reviewed the negative declaration and these waste discharge requirements will mitigate or avoid any significant impacts on water quality due to the discharges from the ARGET facility.

C. State and Federal Regulations, Policies, and Plans

1. **Water Quality Control Plans.** The Regional Water Board adopted a *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition* (hereinafter Basin Plan) that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan.

The Basin Plan at page II-2.00 states that the beneficial uses of any specifically identified water body generally applies to its tributary streams. The Basin Plan does not specifically identify beneficial uses for Buffalo Creek, Alder Creek or Sailor Bar Park Pond, but does identify present and potential uses for the American River, to which Buffalo Creek, Alder Creek and potentially Sailor Bar Park Pond are tributary. In addition the Basin Plan does not specifically identify beneficial uses for Morrison Creek, but does identify present and potential uses for the Sacramento River, to which Morrison Creek is tributary. These beneficial uses of the American and Sacramento Rivers are municipal and domestic supply (MUN); agricultural supply, irrigation and stock watering (AGR); water contact recreation (REC-1); non-contact water recreation (REC-2); warm freshwater habitat (WARM); cold freshwater habitat (COLD); warm and cold migration of aquatic organisms (MIGR); warm and cold spawning (SPWN); wildlife habitat (WILD). The Sacramento River has an additional designated beneficial use of navigation (NAV). In addition, State Water Resources Control Board (State Water Board) Resolution No. 88-63 requires that, with certain exceptions, the Regional Water Board assign the municipal and domestic supply use to water bodies that do not have beneficial uses listed in the Basin Plan. Thus, as discussed in detail in this Fact Sheet, beneficial uses applicable to the American River, Buffalo Creek, Alder Creek, Morrison Creek and the Sailor Bar Park Pond are as follows:

Discharge Point	Receiving Water Name	Beneficial Use(s)
001, 002 and 005	Buffalo Creek and Alder Creek, Tributaries of the American River	<u>Existing:</u> MUN, AGR, IND, REC-1, REC-2, WARM, COLD, MIGR, SPWN, WILD.
003/004	Morrison Creek, Tributary of the Sacramento River	<u>Existing:</u> MUN, AGR, IND, REC-1, REC-2, WARM, COLD, MIGR, SPWN, WILD.
004, 006, 007, 008, 009 and 011	American River	<u>Existing:</u> MUN, AGR, IND, REC-1, REC-2, WARM, COLD, MIGR, SPWN, WILD.
010	Sailor Bar Pond, Potentially tributary to American River	<u>Existing:</u> MUN, AGR, IND, REC-1, REC-2, WARM, COLD, WILD.

The Basin Plan on page II-1.00 states: “*Protection and enhancement of existing and potential beneficial uses are primary goals of water quality planning...* ” and with respect to disposal of wastewaters states that “*...disposal of wastewaters is [not] a prohibited use*”

of waters of the State; it is merely a use which cannot be satisfied to the detriment of beneficial uses.”

The federal Clean Water Act, Section 101(a)(2), states: “it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife, and for recreation in and on the water be achieved by July 1, 1983.” Federal Regulations, developed to implement the requirements of the Clean Water Act, create a rebuttable presumption that all waters be designated as fishable and swimmable. Federal Regulations, 40 CFR Sections 131.2 and 131.10, require that all waters of the State regulated to protect the beneficial uses of public water supply, protection and propagation of fish, shell fish and wildlife, recreation in and on the water, agricultural, industrial and other purposes including navigation. Section 131.3(e), 40 CFR, defines existing beneficial uses as those uses actually attained after November 28, 1975, whether or not they are included in the water quality standards. Federal Regulation, 40 CFR Section 131.10 requires that uses be obtained by implementing effluent limitations, requires that all downstream uses be protected and states that in no case shall a state adopt waste transport or waste assimilation as a beneficial use for any waters of the United States.

In reviewing whether the existing and/or potential uses of the American and Sacramento River apply to Buffalo Creek, Alder Creek, and Sailor Bar Park Pond, and Morrison Creek, respectively, the Regional Water Board has considered the following facts:

a. Domestic Supply and Agricultural Supply

The Regional Water Board is required to apply the beneficial uses of municipal and domestic supply to Buffalo Creek, Alder Creek, Morrison Creek and Sailor Bar Park Pond based on State Water Board Resolution No. 88-63 which was incorporated in the Basin Plan pursuant to Regional Water Board Resolution No. 89-056.

b. Water Contact and Noncontact Recreation and Esthetic Enjoyment

The Regional Water Board finds that the discharges flow through residential areas, there is ready public access to the receiving waters, exclusion of the public is unrealistic and contact recreational activities currently exist along Buffalo Creek, Alder Creek, Morrison Creek and Sailor Bar Park Pond and downstream waters. Prior to flowing into the American River, Buffalo Creek, Alder Creek and Morrison Creek flow through areas of general public access, meadows, and residential and commercial areas. Sailor Bar Park Pond is accessible to the public and is used for fishing. The American and Sacramento Rivers offer considerable recreational opportunities.

c. Preservation and Enhancement of Fish, Wildlife, and Other Aquatic Resources

Buffalo Creek, Alder Creek and the Sailor Bar Park pond flow to the American River. It is highly unlikely that the overflow from Sailor Bar Park would ever directly reach the American River due to the dredger tailings through which the overflow must traverse. However, there is a potential for the pond to indirectly discharge to the American River via a subsurface pathway. The Basin Plan (Table II-1) designates the

American River as being both a cold and warm freshwater habitat; wildlife habitat; warm and cold migration of aquatic organisms; and warm and cold spawning, reproduction, and/or early development of freshwater organisms. The American River supports significant aquatic life, and therefore these beneficial uses apply to its tributaries. Morrison Creek flows to the Sacramento River. The Basin Plan (Table II-1) designates the Sacramento River below the American the confluence with American River as being both a cold and warm freshwater habitat; wildlife habitat; warm and cold migration of aquatic organisms; and warm spawning, reproduction, and/or early development of freshwater organisms. The Sacramento River supports significant aquatic life, and therefore these beneficial uses apply to its tributaries

Upon review of the flow conditions, habitat values, and beneficial uses of Buffalo Creek and Alder Creek, and Morrison Creek, and the facts described above, the Regional Water Board finds that the beneficial uses identified in the Basin Plan for the American River and Sacramento River are applicable to Buffalo Creek and Alder Creek, and Morrison Creek, respectively, in the vicinity of the discharges. Given the location of the Sailor Bar Park Pond, the beneficial uses of SPWN and MIGR are not applicable.

2. **Thermal Plan.** The State Water Board adopted a *Water Quality Control Plan for Control of Temperature in Coastal and Interstate Waters and Enclosed Bays and Estuaries of California* (Thermal Plan) on May 18, 1972, and amended this plan on September 18, 1975. This plan contains temperature objectives for inland surface waters.
3. **National Toxics Rule (NTR) and California Toxics Rule (CTR).** USEPA adopted the NTR on December 22, 1992, which was amended on May 4, 1995 and November 9, 1999, and the CTR on May 18, 2000, which was amended on February 13, 2001. These rules include water quality criteria for priority pollutants and are applicable to this discharge.
4. **State Implementation Policy.** On March 2, 2000, State Water Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (State Implementation Policy or SIP). The SIP became effective on April 28, 2000, with respect to the priority pollutant criteria promulgated for California by the USEPA through the NTR and to the priority pollutant objectives established by the Regional Water Boards in their basin plans, with the exception of the provision on alternate test procedures for individual discharges that have been approved by USEPA Regional Administrator. The alternate test procedures provision was effective on May 22, 2000. The SIP became effective on May 18, 2000. The SIP includes procedures for determining the need for and calculating water quality-based effluent limitations (WQBELs), and requires Dischargers to submit data sufficient to do so.
5. **Compliance Schedules and Interim Requirements.** In accordance with Section 2.1 of the SIP, compliance schedules and interim requirements may only be granted to existing discharges. Two of the existing discharges, ARGET (Discharge 001) and GET J (Discharge 005) have compliance schedules and associated interim requirements.

The ARGET facility currently has 4 to 6 µg/L perchlorate in the influent to the facility. Concentrations of perchlorate have historically been as high as 8 µg/L in the effluent. The previous effluent limit was 12 µg/L perchlorate as it was determined not to be cost effective to reduce the concentrations from 6 µg/l to 4 µg/L and there was significant dilution available in the American River. The Discharger has proposed adding additional groundwater extraction wells in the future, with treatment at the ARGET facility. Those additional extraction wells currently are treated at the GET D facility, with discharge to land. The influent at the GET D facility contains approximately 200 µg/L perchlorate. Prior to adding those extraction wells the Discharger will add facilities to remove perchlorate at ARGET. Once the treatment facilities are added, the Discharger will be able to meet the same effluent limits established for the other GET facilities. Therefore, interim effluent limits (until January 2009) for perchlorate are established at 8 µg/L for daily maximum and monthly averages. In the interim, mixing of the ARGET effluent with the effluent from GET E/F in Buffalo Creek (<4 µg/L perchlorate) will keep the perchlorate concentration below the WQO for perchlorate of 6 µg/l.

The GET J treatment system utilizes low-watt ultraviolet light for the destruction of NDMA. Operation of this system to date has shown that there are periodic detections (estimated >0.005 µg/L) in the effluent from the treatment facility. This is greater than the Monthly Average Limitation of 0.002 µg/L. The ability of the treatment system to consistently remove low concentrations of NDMA in the influent to at or below 0.002 µg/L is not certain. The design of the system was based on a pilot test at the Discharger's GET B facility and the data extrapolated to the lower concentrations needed to meet effluent limitations. The Discharger is evaluating options for treatment of NDMA at GET J. In the interim, the effluent limitation for GET J is established in at 0.008 µg/L, the Notification Level for NDMA established by the California Department of Health Services. Mixing of the GET J effluent with that from GET E/F and ARGET, both non-detect for NDMA, in Buffalo Creek will reduce the concentration of NDMA in Buffalo Creek to approximately at 0.002 µg/L, the WQO and final effluent limitation for NDMA. The Discharger has been given until January 2008 to complete the studies and make the necessary modifications to GET J to meet the final effluent limitation of 0.002 µg/L NDMA.

6. **Antidegradation Policy.** The permitted discharge is consistent with the antidegradation provisions of 40 CFR 131.12 and State Water Resources Control Board Resolution 68-16. Compliance with these requirements will result in the use of best practicable treatment or control of the discharge. The impact on existing water quality will be insignificant.
7. **Anti-Backsliding Requirements.** Sections 402(o)(2) and 303(d)(4) of the CWA and 40 CFR Section 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require that effluent limitations in a reissued permit must be as stringent as those in the previous permit, with some exceptions in which limitations may be relaxed. The effluent limits are at least as stringent as those contained in the previous order. There are new facilities added in this permit, therefore anti-backsliding provisions do not apply to those new facilities.

D. Impaired Water Bodies on CWA 303(d) List

1. The Basin Plan includes a list of Water Quality Limited Segments (WQLSs), which are defined as “...those sections of lakes, streams, rivers or other fresh water bodies where water quality does not meet (or is not expected to meet) water quality standards even after the application of appropriate limitations for point sources (40 CFR 130, et seq.).” The Basin Plan also states, “Additional treatment beyond minimum federal standards will be imposed on dischargers to WQLSs. Dischargers will be assigned or allocated a maximum allowable load of critical pollutants so that water quality objectives can be met in the segment.” The listing for the western portion Sacramento-San Joaquin Delta waterways includes: diazinon and chlorpyrifos, organo-chlorine Group A pesticides, mercury, and unknown toxicity. The listing for the American River includes mercury and unknown toxicity. There have been no detections of mercury, diazanon, chlorpyrifos, or organo-chlorine Group A pesticides in the effluent from the GETs nor in the plumes of groundwater pollution captured by the GETs. Buffalo Creek, Alder Creek and Morrison Creek are not listed on the 303(d) list.

E. Other Plans, Policies and Regulations – Not Applicable

IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

Effluent limitations and toxic and pretreatment effluent standards established pursuant to Sections 301 (Effluent Limitations), 302 (Water Quality Related Effluent Limitations), 304 (Information and Guidelines), and 307 (Toxic and Pretreatment Effluent Standards) of the Clean Water Act (CWA) and amendments thereto are applicable to the discharge.

The federal Clean Water Act (CWA) mandates the implementation of effluent limitations that are as stringent as necessary to meet water quality standards established pursuant to state or federal law. (33 U.S.C., Section 1311(b)(1)(C); 40 C.F.R., Section 122.44(d)(1)) NPDES permits must incorporate discharge limits necessary to ensure that water quality standards are met. This requirement applies to narrative criteria as well as to criteria specifying maximum amounts of particular pollutants. Pursuant to Federal Regulations, 40 C.F.R. section 122.44(d)(1)(i), NPDES permits must contain limits that control all pollutants that “are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard, including state narrative criteria for water quality.” Federal Regulations, 40 CFR, Section 122.44(d)(1)(vi), further provide that “[w]here a state has not established a water quality criterion for a specific chemical pollutant that is present in an effluent at a concentration that causes, has the reasonable potential to cause, or contributes to an excursion above a narrative criterion within an applicable State water quality standard, the permitting authority must establish effluent limits.”

The Regional Water Board’s Basin Plan, page IV-17.00 contains an implementation policy (“Policy for Application of Water Quality Objectives”) that specifies that the Regional Water Board “will, on a case-by-case basis, adopt numerical limitations in orders which will implement the narrative objectives.” This Policy complies with 40 CFR 122.44(d)(1). With respect to narrative objectives, the Regional Water Board must establish effluent limitations using one or

more of three specified sources, including EPA's published water quality criteria, a proposed state criterion (*i.e.*, water quality objective), or an explicit state policy interpreting its narrative water quality criteria (*i.e.*, the Regional Water Board's "Policy for Application of Water Quality Objectives")(40 C.F.R. 122.44(d)(1) (vi) (A), (B) or (C)). The Basin Plan contains a narrative objective requiring that: "*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life*". The Basin Plan requires the application of the most stringent objective necessary to ensure that surface water and groundwater do not contain chemical constituents, toxic substances, radionuclides, or taste and odor producing substances that adversely affect beneficial uses. The beneficial uses include MUN, AGR, REC-1, REC-2, WARM, COLD, MIGR, SPWN, and WILD. The Basin Plan states that material and relevant information, including numeric criteria, and recommendations from other agencies and scientific literature will be utilized in evaluating compliance with the narrative toxicity objective. The Basin Plan also limits chemical constituents in concentrations that adversely affect surface water beneficial uses. For waters designated as municipal, the Basin Plan specifies that, at a minimum, waters shall not contain concentrations of constituents that exceed Maximum Contaminant Levels (MCL) of CCR Title 22. The Basin Plan further states that, to protect all beneficial uses, the Regional Water Board may apply limits more stringent than MCLs. When a reasonable potential exists for exceeding a narrative objective, Federal Regulations mandate numerical effluent limitations and the Basin Plan clearly establishes a procedure for translating the narrative objectives into numerical effluent limitations.

A. Discharge Prohibitions

1. As stated in Section I.G of Attachment D, Federal Standard Provisions, this Order prohibits bypass from any portion of the treatment Facility. Federal Regulations, 40 CFR 122.41 (m), define "bypass" as the intentional diversion of waste streams from any portion of a treatment facility. This section of the Federal Regulations, 40 CFR 122.41 (m)(4), prohibits bypass unless it is unavoidable to prevent loss of life, personal injury, or severe property damage. In considering the Regional Water Board's prohibition of bypasses, the State Water Resources Control Board adopted a presidential decision, Order No. WQO 2002-0015, which cites the Federal Regulations, 40 CFR 122.41(m), as allowing bypass only for essential maintenance to assure efficient operation. In the case of *United States v. City of Toledo, Ohio* (63 F. Supp 2d 834, N.D. Ohio 1999) the Federal Court ruled that "any bypass which occurs because of inadequate plant capacity is unauthorized...to the extent that there are 'feasible alternatives', including the construction or installation of additional treatment capacity".

B. Technology-Based Effluent Limitations

1. Scope and Authority

- a. As specified in 40 CFR Section 122.44(a)(1), permits are required to include technology based effluent limitations

2. Applicable Technology-Based Effluent Limitations

- a. **Volatile Organic Compounds (VOCs).** The effluent limits for VOCs are based on Best Available Technology utilizing either air stripping or carbon adsorption which have been demonstrated to readily reduce VOCs to below 0.5 µg/L. The 0.5µg/L effluent limitation is below the Water Quality Based Effluent Limits (WQBEL) calculated below for VOCs of concern, with the exception of 1,2-Dichloroethane. The WQBEL will be used for 1,2-Dichloroethane. . The proposed effluent limitations are consistent with those found in the existing Order.
- b. **Perchlorate.** The monthly average effluent limitation for perchlorate is established at 4 µg/L, a value that the Discharger, utilizing commercially available technology at GET E/F, Interim GET H, GET and Interim GET K, has shown to be capable of technically and economically meeting on a consistent basis
- c. **Flow.** This Order contains a maximum daily and long term average effluent limitations of 5.4 mgd for ARGET, 8.64 mgd for GET E/F, 6.39 mgd for GET H/Chettentham, 7.17 mgd for GET J, 0.58/4.67 mgd for interim GETK/longterm GET K, 3.1 mgd, 1.56 for GET L/L1, and 0.18 mgd for Sailor Bar Park Well based on the maximum daily effluent flows reported in Aerojet's RWD. In accordance with 40 CFR Section 122.45, this Order includes mass effluent limitations based on the long term average effluent flows listed above and reported in the Discharger's RWD.

3. Final Technology-Based Effluent Limitations

Table F-1 summarizes the final technology-based effluent limitations established in this Order.

Table F-1
Summary of Technology-based Effluent Limitations
Discharge Points 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 011

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
ARGET Flow	mgd	5.4	--	5.4	--	--
GET E/F Flow	mgd	8.64		8.64		
GET H/Chettenham Flow	mgd	6.39		6.39		
GET J Flow	mgd	7.17		7.17		
Interim GET K Flow	mgd	0.58		0.58		
Long-term GET K Flow	mgd	4.67		4.67		
GET L/L1 Flow	mgd	1.56		1.56		
Sailor Bar Park Well Flow	mgd	0.18		0.18		
VOCs ¹	µg/L	0.5		0.75		
Perchlorate ²	µg/L	4.0		6.0		

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
N-nitrosodimethylamine	µg/L	0.002		0.005		
<p>1 1,2-dichloroethane has a WQBELs listed below that are more stringent than the 0.5 µg/L listed on this table.</p> <p>2 In the existing permit ARGET has an effluent limitation of 10 µg/L for a monthly average and 18 µg/L for a daily maximum. The current ARGET influent is between 4 and 6 µg/L. As planned new extraction wells are added and their extracted groundwater sent to the ARGET facility, treatment for removal of perchlorate will be added and the effluent limitations will be the same as those for the other treatment facilities.</p>						

C. Water Quality-Based Effluent Limitations (WQBELs)

1. Scope and Authority

As specified in 40 CFR Section 122.44(d)(1)(i), permits are required to include WQBELs for pollutants (including toxicity) that are or may be discharged at levels that cause, have reasonable potential to cause, or contribute to an excursion above any state water quality standard. The process for determining reasonable potential and calculating WQBELs when necessary is intended to protect the designated uses of the receiving water as specified in the Basin Plan, and achieve applicable water quality objectives and criteria that are contained in other state plans and policies, or water quality criteria contained in the CTR and NTR.

2. Applicable Beneficial Uses and Water Quality Criteria and Objectives

- a. **Beneficial Uses.** The Basin Plan at page II-2.00 states that the beneficial uses of any specifically identified water body generally applies to its tributary streams. The Basin Plan does not specifically identify beneficial uses for Buffalo Creek and Alder Creek, or Morrison Creek, tributary to the American River and Sacramento River, respectively, but does identify present and potential uses for the American and Sacramento Rivers. These beneficial uses are municipal and domestic supply (MUN); agricultural supply, irrigation and stock watering (AGR); water contact recreation (REC-1); non-contact water recreation (REC-2); warm freshwater habitat (WARM); cold freshwater habitat (COLD); warm and cold migration of aquatic organisms (MIGR); warm and cold spawning (SPWN); wildlife habitat (WILD). In addition, State Water Resources Control Board (State Water Board) Resolution No. 88-63 requires that, with certain exceptions, the Regional Water Board assign the municipal and domestic supply use to water bodies that do not have beneficial uses listed in the Basin Plan. Thus, as discussed in detail in this Fact Sheet, beneficial uses applicable to the American River, Sacramento River, Buffalo Creek, Alder Creek, Morrison Creek and Sailor Bar Park Pond are as follows:

Discharge Point	Receiving Water Name	Beneficial Use(s)
001, 002 and 005	Buffalo Creek and Alder Creek, Tributary of the American River	<u>Existing:</u> MUN, AGR, REC-1, REC-2, WARM, COLD, MIGR, SPWN, WILD.
003	Morrison Creek, Tributary of the Sacramento River	<u>Existing:</u> MUN, AGR, REC-1, REC-2, WARM, COLD, MIGR, SPWN, WILD.
004, 006, 007, 008, 009, 011 and 012	American River	<u>Existing:</u> MUN, AGR, REC-1, REC-2, WARM, COLD, MIGR, SPWN, WILD.
010	Sailor Bar Pond, Potentially tributary to American River	<u>Existing:</u> MUN, AGR, REC-1, REC-2, WARM, COLD, MIGR, SPWN, WILD.

- b. **Dilution Credits/Mixing Zones.** The Regional Board finds that based on the available information that three of the receiving waters, Buffalo Creek, Morrison Creek and Alder Creek, and on the Discharger's application, that these three creeks, absent the discharges, are ephemeral streams, or at times the flow upstream of the discharges is significantly less than that of the discharge. The ephemeral an/or low flow nature of the creeks means that the designated beneficial uses must be protected, but that no credit for receiving water dilution is available. Although the discharge, at times, maintains the aquatic habitat, constituents may not be discharged that may cause harm to aquatic life. At other times, natural flows within the creeks help support the aquatic life. Dry conditions occur primarily in the summer months, but dry conditions may also occur throughout the year, particularly in low rainfall years. The lack of dilution results in more stringent effluent limitations to protect contact recreational uses, drinking water standards, agricultural water quality goals and aquatic life. Therefore, the Regional Water Board has evaluated the need for water quality-based effluent limitations for pollutants without benefit of dilution in this Order. These water quality-based effluent limitations are based on the application of water quality criteria or objectives at the points of discharge.
- c. **Hardness.** The minimum effluent hardness, maximum receiving water pH limitation, and measured effluent temperature were used to develop hardness, pH, and/or temperature dependent WQBELs. These worst-case values have been chosen to protect the beneficial uses of the receiving water and are summarized below:

Hardness:	130 mg/L
pH:	8.5 standard units
Temperature:	21 °C

3. Determining the Need for WQBELs

- a. Reasonable potential (RP) was determined by calculating the projected maximum effluent concentration (MEC) for each constituent and comparing it to applicable water quality criteria; if a criterion was exceeded, the discharge was determined to have reasonable potential to exceed a water quality objective for that constituent. The

projected MEC is determined by multiplying the observed MEC by a factor that accounts for statistical variation. The multiplying factor is determined (for 99% confidence level and 99% probability basis) using the number of results available and the coefficient of variation (standard deviation divided by the mean) of the sample results. In accordance with the SIP, non-detect results were counted as one-half the detection level when calculating the mean. For all constituents for which the source of the applicable water quality standard is the CTR or NTR, the multiplying factor is 1. Reasonable potential evaluation was based on the methods used in the SIP and the U.S. EPA Technical Support Document for Water Quality-Based Toxics Control [EPA/505/2-90-001].

- b. Federal regulations require effluent limitations for all pollutants that are or may be discharged at a level that will cause or have the reasonable potential to cause, or contribute to an in-stream excursion above a narrative or numerical water quality standard. Based on information submitted as part of the application, in studies, and as directed by monitoring and reporting programs the Regional Water Board finds that the discharge does have a reasonable potential to cause or contribute to an in-stream excursion above a water quality standard for copper. Effluent limitations for copper are included in this Order.
- c. The reasonable potential analysis for detected constituents is summarized below in Table F-2.

Table F-2.
RPA Summary for Detected Constituents
Discharges 001-012

Parameter	Units	MEC ¹	99 th MEC ¹	WQO/ WQC ²	Source	RP ³
Perchlorate	µg/L	4	4	6	OEHHA Public Health Goal	Y
NDMA	µg/L	0.005	0.005	0.002	CTR HH	Y
Copper	µg/L	27	27	12/18	CTR CCC/CMC	Y
Mercury	µg/L	0.001	0.001	0.05	CTR HH	N
Nickel	µg/L	13	13	65/590	CTR CCC/CMC	N
Zinc	µg/L	42	42	150	CTR CCC/CMC	N
Barium	µg/L	90	124	1000	California Primary MCL	N
Iron	µg/L	55	75	300	California Secondary MCL	N
Manganese	µg/L	<5	23	50	California Secondary MCL	N
Chloride	mg/L	13	39	106	Water Quality for Agriculture	N
Nitrate	mg/L	0.8	4	10	California Primary MCL	N
Sulfate	mg/L	12	60	250	California Secondary MCL	N
Electrical Conductivity	umhos/cm	210	230	700	Water Quality for Agriculture	N
Total Dissolved Solids	mg/L	220	260	450	Water Quality for Agriculture	N

1. MEC: maximum effluent concentration. 99th MEC: maximum predicted effluent concentration using 99th percentile multiplier, note that multiplier is equal to "1" when applying CTR criteria.
2. WQO: water quality objective. WQC: water quality criteria.
3. Reasonable potential.
4. Indeterminate, inadequate information to establish limitations. See discussion below.
5. Reasonable potential found due to use of salt at the facility

- d. **Copper.** Copper is known to cause adverse impacts on aquatic species, particularly fish. The Basin Plan's chemical constituents water quality objective has a copper limit for the American River of 0.01 mg/L. Furthermore, the same water quality objective prohibits chemical constituents in concentrations that adversely affect beneficial uses. Applying a hardness of 130 mg/L (worst case effluent hardness) the allowable continuous concentration is 0.011 mg/L and the allowable instantaneous concentration is 0.017 mg/L.
- e. **pH.** The Basin Plan includes numeric water quality objectives that the pH "...not be depressed below 6.5 nor raised above 8.5. Changes in normal ambient pH levels shall not exceed 0.5 in fresh waters with designated COLD or WARM beneficial uses." The receiving water is designated as having both COLD and WARM beneficial uses. An effluent limitation for pH is included in this Order, and is based on the Basin Plan objectives for pH.
- f. **1,2-Dichloroethane.** 1,2-Dichloroethane has not been detected in the effluent of the GET facilities (PQL of 0.5 µg/L) but has been detected in the groundwater contaminant plumes. The estimated incremental 1×10^{-6} excess cancer risk value established by the Office of Environmental Health Hazard Assessment for the State of California for this volatile organic is 0.38 µg/L. As there is little to no dilution in Buffalo Creek and Morrison Creek, the monthly average effluent limitation is established at the risk value.
- g. **Perchlorate.** Perchlorate has been determined to have a potential adverse impact on the thyroid. The California Office of Health Hazard Assessment has developed a Public Health Goal for perchlorate of 6 µg/L. Concentrations below 6 µg/L would pose a *de minimus* risk to human health.

4. WQBEL Calculations

- a. The Discharger conducted monitoring for priority and non-priority pollutants. The analytical results of one comprehensive sampling event were submitted to the Regional Water Board. The results of this sampling event were used in developing the requirements of this Order. Effluent limitations are included in this Order to protect the beneficial uses of the receiving stream and to ensure that the discharge complies with the Basin Plan objective that toxic substances not be discharged in toxic amounts.
- b. **Calculations for Effluent Limitations.** In calculating maximum effluent limitations, the effluent concentration allowances were set equal to the criteria/standards/objectives.

$$ECA_{acute} = CMC \qquad ECA_{chronic} = CCC$$

$$ECA_{HH} = HH$$

where: ECA_{acute} = effluent concentration allowance for acute (one-hour average)
toxicity criterion

ECA_{chronic} = effluent concentration allowance for chronic (four-day average) toxicity criterion

ECA_{HH} = effluent concentration allowance for human health, agriculture, or other long-term criterion/objective

CMC = criteria maximum concentration (one-hour average)

CCC = criteria continuous concentration (four-day average, unless otherwise noted)

HH = human health, agriculture, or other long-term criterion/objective

Acute and chronic toxicity ECAs were then converted to equivalent long-term averages (LTA) using statistical multipliers and the lowest is used. Additional statistical multipliers were then used to calculate the maximum daily effluent limitation (MDEL) and the average monthly effluent limitation (AMEL). The statistical multipliers were calculated using data shown in Table 1.

Human health ECAs are set equal to the AMEL and a statistical multiplier is used to calculate the MDEL.

$$MDEL = mult_{MDEL} \left[\min \left(\overbrace{M_A ECA_{acute}}^{LTA_{acute}}, \underbrace{M_C ECA_{chronic}}_{LTA_{chronic}} \right) \right]$$

$$MDEL_{HH} = \left(\frac{mult_{MDEL}}{mult_{AMEL}} \right) AMEL_{HH}$$

where: $mult_{AMEL}$ = statistical multiplier converting minimum LTA to AMEL

$mult_{MDEL}$ = statistical multiplier converting minimum LTA to MDEL

M_A = statistical multiplier converting CMC to LTA

M_C = statistical multiplier converting CCC to LTA

- c. **Mass-based Effluent Limitations.** In accordance with 40 CFR 122.45(b)(2), mass-based limitations are calculated by multiplying the concentration limitation by the long-term average flow and the appropriate unit conversion factors. Mass based limits are found in Tables IV(A)(1) through IV(A)(12).

Mass-based effluent limitations, or mass emission rates (MERs), for WQBELs applicable to Discharge 001 are calculated as follows:

$$MER = 8.34 \left(\frac{lb - L}{mg - gal} \right) \times AMEL - or - MDEL \times flow(mgd)$$

- d. **Final WQBELs.** Table F-3 summarizes the final WQBELs contained in this Order.

Table F-3
Discharge Points 001-011

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
perchlorate	µg/L	6				
NDMA	µg/L	0.002				
Total Copper	µg/L	11	--	17	--	--
pH	standard units	--	--	--	6.5	8.5
1,2-DCA	µg/L	0.38	--	0.50	--	--

5. Whole Effluent Toxicity (WET)

The Basin Plan specifies a narrative objective for toxicity, requiring that “All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life.” Compliance with this objective will be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies, bioassays of appropriate duration and/or other appropriate methods as specified by the Regional Water Board. The survival of aquatic life in surface waters subjected to a waste discharge, or other controllable water quality factors, shall not be less than that for the same water body in areas unaffected by the waste discharge, or when necessary, for other control water that is consistent with the requirements for “experimental water” as defined in Standard Methods for the Examination of Water and Wastewater (American Public Health Association, et al. 1992).

In addition to the Basin Plan requirements, Section 4 of the SIP states that a chronic toxicity effluent limitation is required in permits for all discharges that will cause, have the reasonable potential to cause, or contribute to chronic toxicity in receiving waters.

Numeric water quality criteria, or Basin Plan numeric objectives currently are not available for many of the aquaculture drugs and chemicals used by aquaculture facilities. Therefore, the Regional Water Board uses the narrative water quality objective for toxicity from the Basin Plan as a basis for determining “reasonable potential” for discharges of these drugs and chemicals. USEPA’s *Technical Support Document Water Quality-based Toxics Control* (TSD) specifies two toxicity measurement techniques that can be employed in effluent characterization; the first is Whole Effluent Toxicity (WET) testing, and the second is chemical-specific toxicity analyses. Whole effluent toxicity (WET) requirements protect the receiving water quality from the aggregate toxic effect of a mixture of pollutants in the effluent. WET tests measure the degree of response of exposed aquatic test organisms to an effluent. The WET approach allows for protection of the narrative “no toxics in toxic amounts” criterion while implementing numeric criteria for toxicity. There are two types of WET tests: acute and chronic. An acute toxicity test is conducted over a short time period and generally measures mortality. A chronic toxicity test is conducted over a longer period of time and may measure mortality, reproduction, and growth. For fish hatcheries WET testing is used most appropriately when the toxic constituents in an

effluent are not completely known; whereas chemical-specific analysis is more appropriately used when an effluent contains only one, or very few, well-known constituents.

Due to the nature of operations and chemical treatments at this Facility, its effluent contains only two known chemicals at any given time (ammonia and NaCl). Therefore, the Regional Water Board is using a chemical-specific approach to determine “reasonable potential” for discharges of aquaculture drugs and chemicals, and ammonia.

D. Final Effluent Limitations

1. 40 CFR Section 122.45 states that:

“...All pollutants limited in permits shall have limitations...expressed in terms of mass except...[f]or pH, temperature, radiation, or other pollutants which cannot appropriately be expressed by mass...Pollutants limited in terms of mass additionally may be limited in terms of other units of measurement, and the permit shall require the permittee to comply with both limitations.”

2. Tables F-4 and F-5 summarize the final technology-based and water quality-based effluent limits established in this Order.

Table F-4
Summary of Final Effluent Limitations
Discharge Points 001 through 011

Parameter	Units	Effluent Limitations			
		Average Monthly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Flow – Discharge 001	mgd	5.0	5.4	--	--
Flow – Discharge 002	mgd	7.92	8.64		
Flow – Discharge 003	mgd	6.39	6.5		
Flow – Discharge 004	mgd	6.39	6.5		
Flow – Discharge 005	mgd	7.17	7.2		
Flow – Discharge 006	mgd	0.58	0.6		
Flow – Discharge 007	mgd	4.67	4.7		
Flow – Discharge 008	mgd	1.54	1.54		
Flow – Discharge 009	mgd	0.52	0.52		
Flow – Discharge 010	mgd	0.18	0.2		
Flow – Discharge 011	mgd	0.86	1.1		
Volatile Organic Contaminants	µg/L	0.5	0.7	--	--
1,2-Dichloroethane	µg/L	0.38	0.5	--	--
1,4-Dioxane	µg/L	3	6		
N-nitrosodimethylamine	µg/L	0.002	0.010	--	--
Perchlorate	µg/L	4	6		
Total Copper	µg/L	17	11	--	--
Acetaldehyde	µg/L	5	--	--	--
Formaldehyde	µg/L	50	--		
pH	standard units	--	--	6.5	8.5

Table F-5
Summary of Final Effluent Limitations
Discharge Point 012

Parameter	Units	Effluent Limitations			
		Total Maximum Discharge ¹	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Flow – Per Monitor Well	mgd	0.01	0.01		
Flow – Per Aquifer Test	mgd	11.5	1.15		
Volatile Organic Contaminants	µg/L	--	1.0	--	--
1,4-Dioxane	µg/L		10		
N-nitrosodimethylamine	µg/L		0.005	--	--
Perchlorate	µg/L		6		
pH	standard units	--	--	6.5	8.5

E. Interim Effluent Limitations

1. See Section IV(A)(2)(a) and IV(A)(6)(2).

Table F-5
Summary of Interim Effluent Limitations
Discharge Points 001 and 005

Parameter	Units	Effluent Limitations			
		Average Monthly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Discharge 001 - Perchlorate	µg/L	8	8		
Discharge 005 - N-nitrosodimethylamine	µg/L	0.008	0.008	--	--

F. Land Discharge Specifications – Not Applicable

G. Reclamation Specifications – Not Applicable

V. RATIONALE FOR RECEIVING WATER LIMITATIONS

A. Surface Water

2. The Clean Water Act, Section 303(a-c), required states to adopt numeric criteria where they are necessary to protect designated uses. The Regional Water Board adopted numeric criteria in the Basin Plan. The Basin Plan is a regulatory reference for meeting the state and federal requirements for water quality control (40 CFR 131.20). State Water Board Resolution No. 68-16, the Antidegradation Policy, does not allow changes in water quality less than that prescribed in Water Quality Control Plans (Basin Plans). The Basin Plan states that; “The numerical and narrative water quality objectives define the least stringent standards that the Regional Water Board will apply to regional waters in order to protect the beneficial uses.” This Order contains Receiving Water Limitations based on the Basin Plan numerical and narrative water quality objectives for Biostimulatory Substances, Chemical Constituents, Color, Dissolved Oxygen, Floating Material, Oil and Grease, pH, Pesticides, Radioactivity, Salinity, Sediment, Settleable Material, Suspended Material, Tastes and Odors, Temperature, Toxicity and Turbidity.
3. Numeric Basin Plan objectives for bacteria, dissolved oxygen, pH, temperature, and turbidity are applicable to this discharge and have been incorporated as Receiving Surface Water Limitations. Rational for these numeric receiving surface water limitations are as follows:
 - a. **Bacteria.** The Basin Plan includes a water quality objective that “[I]n water designated for contact recreation (REC-1), the fecal coliform concentration based

on a minimum of not less than five samples for any 30-day period shall not exceed a geometric mean of 200/100 ml, nor shall more than ten percent of the total number of samples taken during any 30-day period exceed 400/100 ml.” Numeric Receiving Water Limitations for bacteria are included in this Order and are based on the Basin Plan objective.

- b. **Dissolved Oxygen.** The Basin Plan includes a water quality objective that “[F]or water bodies outside of the legal boundaries of the Delta, the monthly median of the mean daily dissolved oxygen (DO) concentrations shall not fall below 85 percent of saturation in the main water mass, and the 95 percentile concentration shall not fall below 75 percent of saturation. The dissolved oxygen concentrations shall not fall below the following minimum levels at any time – Waters designated WARM – 5.0 mg/L, Waters designated COLD – 7.0 mg/L, and Waters designated SPAWN – 7.0 mg/L. The American River is designated as having WARM, COLD, and SPAWN designated uses. Numeric Receiving Water Limitations for dissolved oxygen are included in this Order and are based on the Basin Plan objective.
- c. **pH.** The Basin Plan includes water quality objectives that the pH “...not be depressed below 6.5 nor raised above 8.5. Changes in normal ambient pH levels shall not exceed 0.5 in fresh waters with designated COLD or WARM beneficial uses.” The American River is designated as having both COLD and WARM beneficial uses. The change in pH of 0.5 (standard pH units) is not included as necessary to protect aquatic life in U.S. EPA’s Ambient Criteria for the Protection of Freshwater Aquatic Life as long as pH does not fall below 6.5 or exceed 8.5 units. Therefore, an averaging period of 30 days has been applied to the Basin Plan receiving water objective for changes in pH. Numeric Receiving Water Limitations for pH are included in this Order and are based on the Basin Plan objectives for pH.
- d. **Temperature.** The Basin Plan includes water quality objectives that prohibit the temperature “... of COLD or WARM intrastate waters be increased more than 5°F above natural receiving water.” The American River is designated having both COLD and WARM beneficial uses. Receiving Water Limitations for temperatures are included in this Order and are based on the Basin Plan objectives for temperature.
- e. **Turbidity.** The Basin Plan includes a water quality objective that “[I]ncreases in turbidity attributable to controllable water quality factors shall not exceed the following limits:
 - *Where natural turbidity is between 0 and 5 Nephelometric Turbidity Units (NTUs), increases shall not exceed 1 NTU.*
 - *Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent.*

- *Where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs.*
- *Where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent.”*

A numeric Receiving Surface Water Limitation for turbidity is included in this Order and is based on the Basin Plan objective for turbidity.

B. Groundwater – Not Applicable

VI. RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

Section 122.48 of 40 CFR requires all NPDES permits to specify recording and reporting of monitoring results. Sections 13267 and 13383 of the CWC authorize the Water Boards to require technical and monitoring reports. The Monitoring and Reporting Program, [Attachment E](#) of this Order, establishes monitoring and reporting requirements to implement federal and state requirements. The following provides the rationale for the monitoring and reporting requirements contained in the Monitoring and Reporting Program for this facility

A. Influent Monitoring

The Order establishes influent monitoring requirements to allow the Discharger to monitor the treatment efficiency of the treatment systems and make sure that influent concentrations are within the design parameters of the treatment systems. As such, monitoring is required for volatile organics, semi-volatile organics, perchlorate, 1,4-Dioxane, n-nitrosodimethylamine, and copper.

B. Effluent Monitoring

Pursuant to the requirements of 40 CFR 122.44(i)(2) effluent monitoring is required for all constituents with effluent limitations. The Monitoring and Reporting Requirements include effluent monitoring requirements in [Attachment E, Section IV](#).

C. Whole Effluent Toxicity Testing

1. **Acute Toxicity.** Weekly 96-hour bioassay testing is required to demonstrate compliance with the effluent limitation for acute toxicity ([Effluent Limitations IV.A.1.e](#)).
2. **Chronic Toxicity.** Quarterly chronic whole effluent toxicity testing is required in order to demonstrate compliance with the Basin Plan’s narrative toxicity objective.

D. Receiving Water Monitoring

1. **Surface Water.** Receiving water monitoring is required to demonstrate compliance with the Receiving Water Limitations.
2. **Groundwater – Not Applicable**

Groundwater monitoring associated with the treatment facilities is not required. Extensive groundwater monitoring is conducted by the Discharger to meet compliance associated with groundwater cleanup requirements established by the Regional Water Board and USEPA under other programs.

F. Other Monitoring Requirements

1. **Solids Disposal Monitoring**

This Order requires an annual solids disposal report describing the annual volume of solids generated by the Facilities and specifying the disposal practices. Solids disposal reporting is required to evaluate compliance with Construction, Operation, and Maintenance Specifications, Section VI.C.5.a, of this Order.

VII. RATIONALE FOR PROVISIONS

A. Standard Provisions

1. **Federal Standard Provisions.** In accordance with 40 CFR section 122.41 and 122.42, the Federal Standard Provisions provided in [Attachment D](#) of this Order apply to this discharge.
2. **Regional Water Board Standard Provisions.** In addition to the Federal Standard Provisions (Attachment D), the Discharger must comply with the Regional Water Board Standard Provisions provided in [Standard Provisions VI.A.2.](#)

40 CFR Section 122.41(a)(1) and (b) through (n) establish conditions that apply to all state-issued NPDES permits. These conditions must be incorporated into the permits either expressly or by reference. If incorporated by reference, a specific citation to the regulations must be included in the Order. 40 CFR Section 123.25(a)(12) allows the State to omit or modify conditions to impose more stringent requirements. In accordance with Section 123.35, this Order omits federal conditions that address enforcement authority specified in 40 CFR Sections 122.41(j)(5) and (k)(2) because the enforcement authority under the CWC is more stringent. In lieu of these conditions, this Order incorporates by reference CWC section 13387(e).

B. Special Provisions

1. Reopener Provisions

- a. [Special Provisions VI.C.1.a.](#) Conditions that necessitate a major modification of a permit are described in 40 CFR section 122.62, which include the following:
 - i. When standards or regulations on which the permit was based have been changed by promulgation of amended standards or regulations or by judicial decision. Therefore, if more stringent applicable water quality standards are promulgated or approved pursuant to section 303 of the Federal Water Pollution Control Act or amendments thereto, the Regional Water Board will revise and modify this Order in accordance with such more stringent standards.
 - ii. When new information, that was not available at the time of permit issuance, would have justified different permit conditions at the time of issuance.
- b. **Whole Effluent Toxicity.** As a result of a Toxicity Reduction Evaluation (TRE), this Order may be reopened to include a chronic toxicity limitation, a new acute toxicity limitation, and/or a limitation for a specific toxicant identified in the TRE. Additionally, if a chronic toxicity water quality objective is adopted by the State Water Board, this Order may be reopened to include a chronic toxicity limitation based on that objective.

2. Special Studies, Technical Reports and Additional Monitoring Requirements

- a. **Chronic Whole Effluent Toxicity Requirements ([Special Provisions VI.C.2.a.](#)).** The Basin Plan contains a narrative toxicity objective that states, "All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life." (Basin Plan at III-8.00.) Based on quarterly whole effluent chronic toxicity testing performed by the Discharger from March 2, 2001 through October 15, 2004, the discharge has reasonable potential to cause or contribute to an in-stream excursion above of the Basin Plan's narrative toxicity objective.

[Special Provisions VI.C.2.a.](#) requires the Discharger to develop a Toxicity Reduction Evaluation (TRE) work plan in accordance with EPA guidance. In addition, the provision establishes a numeric toxicity trigger, requirements for accelerated monitoring to confirm effluent toxicity, and a protocol for requiring the Discharger to initiate a TRE.

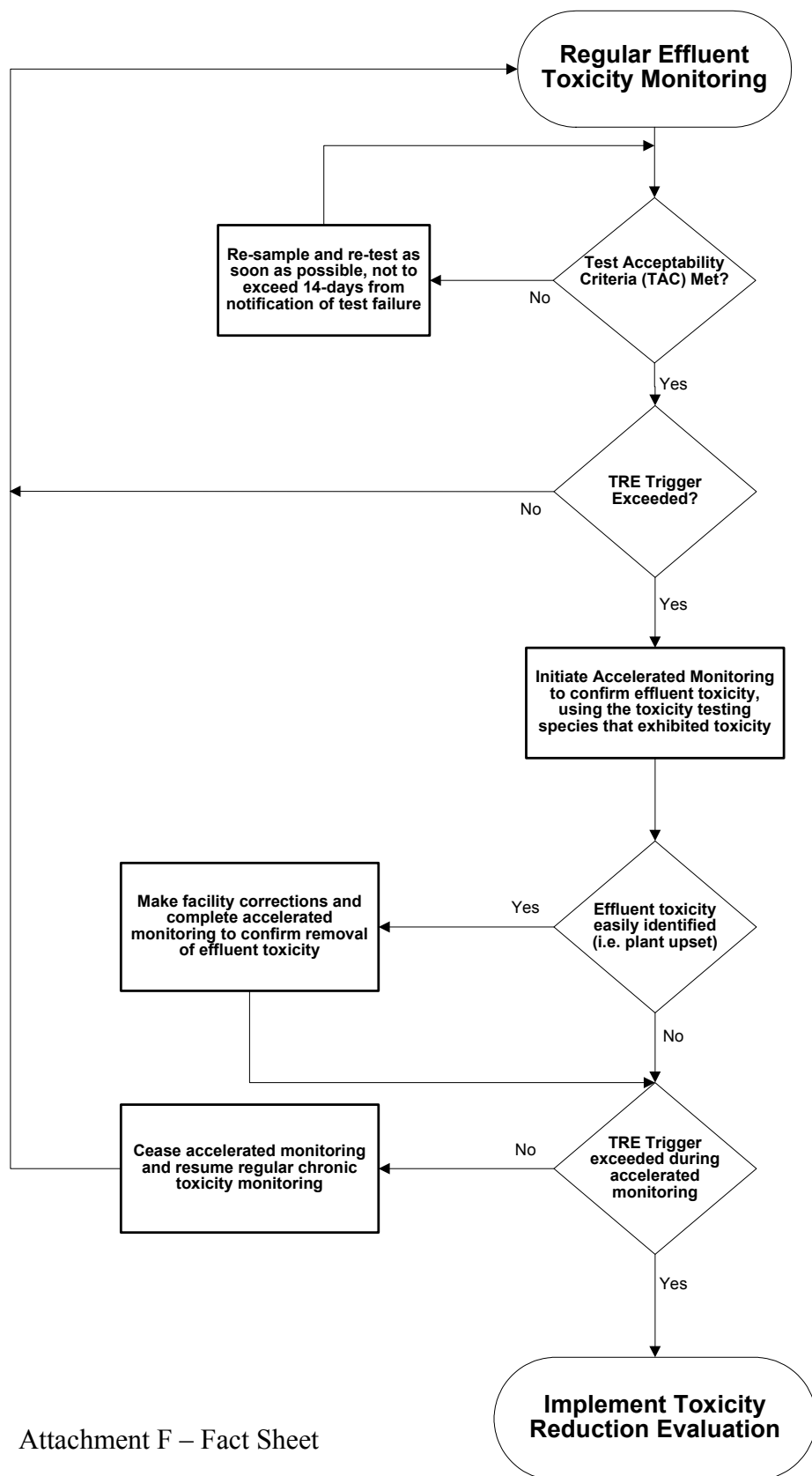
TRE Trigger. A numeric TRE Trigger of $> 1 \text{ TUc}$ (where $\text{TUc} = 100/\text{NOEC}$) is applied in the provision, because this Order does not allow any dilution for the chronic condition. Therefore, a TRE is triggered when the effluent exhibits toxicity at 100% effluent.

Accelerated Monitoring. The provision requires accelerated WET testing when a regular WET test result exceeds the TRE Trigger to confirm effluent toxicity prior to requiring implementation of a TRE.

TRE Guidance. The Discharger is required to prepare the TRE work plan in accordance with USEPA guidance. Numerous guidance documents are available, as identified below:

- Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants, *(EPA/833B-99/002), August 1999.*
- Generalized Methodology for Conducting Industrial TREs, *(EPA/600/2-88/070), April 1989.*
- Methods for Aquatic Toxicity Identification Evaluations: Phase I Toxicity Characterization Procedures, *Second Edition, EPA 600/6-91/005F, February 1991.*
- Toxicity Identification Evaluation: Characterization of Chronically Toxic Effluents, Phase I, *EPA 600/6-91/005F, May 1992.*
- Methods for Aquatic Toxicity Identification Evaluations: Phase II Toxicity Identification Procedures for Samples Exhibiting acute and Chronic Toxicity, *Second Edition, EPA 600/R-92/080, September 1993.*
- Methods for Aquatic Toxicity Identification Evaluations: Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity, *Second Edition, EPA 600/R-92/081, September 1993.*
- Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, *Fifth Edition, EPA-821-R-02-012, October 2002.*
- Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, *Fourth Edition, EPA-821-R-02-013, October 2002.*
- Technical Support Document for Water Quality-based Toxics Control, *EPA/505/2-90-001, March 1991*

Figure F-15
WET Accelerated Monitoring Flow Chart



3. Best Management Practices and Pollution Prevention – Not Applicable

4. Compliance Schedules

- a. **ARGET Perchlorate Effluent Limitation.** Effective immediately and ending on 1 January 2009, or until the treatment system to remove perchlorate at the ARGET facility is constructed, whichever is sooner, the discharge of treated effluent from the ARGET facility shall maintain compliance with 8.0 µg/l as the effluent limitation for perchlorate at Discharge Point 001. Mixing with the GET E/F effluent will keep the perchlorate concentration below the Water Quality Objective of 6 µg/L in Buffalo Creek. No additional extraction wells containing perchlorate will be added to the ARGET system until perchlorate treatment is added at ARGET.
- b. **GET J NDMA Effluent Limitation.** Effective immediately and ending on 1 January 2008, the discharge of treated effluent from the GET J facility shall maintain compliance with 0.008 µg/L as the effluent limitation for NDMA at Discharge Point 005. This interim effluent limitation shall apply in lieu of the corresponding final effluent limitation for NDMA specified during the time period indicated in this Order. The Discharger will be evaluating the current NDMA treatment system and alternate treatment systems in order to determine the best means of complying with the final effluent limitation, the Water Quality Objective of 0.002 µg/L.

5. Construction, Operation, and Maintenance Specifications

- a. **Provisions VI.C.5.a,b.** Solid waste disposal provisions in this Order are based on the requirements of CCR Title 27 and prevention of unauthorized discharge of solid wastes into waters of the United States or waters of the State. Other construction, operation, and maintenance specifications are to prevent other unauthorized discharges to waters of the United States or waters of the State.

6. Special Provisions for Municipal Facilities (POTWs Only) – Not Applicable

7. Other Special Provisions –Not Applicable

VIII. PUBLIC PARTICIPATION

The California Regional Water Quality Control Board, Central Valley Region (Regional Water Board) is considering the issuance of waste discharge requirements (WDRs) that will serve as a National Pollutant Discharge Elimination System (NPDES) permit for the Tsar Nicoulai Sturgeon Farm. As a step in the WDR adoption process, the Regional Water Board staff has developed tentative WDRs. The Regional Water Board encourages public participation in the WDR adoption process.

A. Notification of Interested Parties

The Regional Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the discharge and has provided them with an opportunity to submit their written comments and recommendations.

B. Written Comments

The staff determinations are tentative. Interested persons are invited to submit written comments concerning these tentative WDRs. Comments should be submitted either in person or by mail to the Executive Office at the Regional Water Board at the address above on the cover page of this Order.

To be fully responded to by staff and considered by the Regional Water Board, written comments should be received at the Regional Water Board offices by 5:00 p.m. on **November 20, 2005**.

C. Public Hearing

The Regional Water Board will hold a public hearing on the tentative WDRs during its regular Board meeting on the following date and time and at the following location:

Date: **28/29 November 2005**
Time: 8:30 am
Location: Regional Water Quality Control Board
11020 Sun Center Dr #200
Rancho Cordova, CA

Interested persons are invited to attend. At the public hearing, the Regional Water Board will hear testimony, if any, pertinent to the discharge, WDRs, and permit. Oral testimony will be heard; however, for accuracy of the record, important testimony should be in writing.

Please be aware that dates and venues may change. Our web address is <http://www.waterboards.ca.gov/centralvalley/> where you can access the current agenda for changes in dates and locations.

D. Waste Discharge Requirements Petitions

Any aggrieved person may petition the State Water Resources Control Board to review the decision of the Regional Water Board regarding the final WDRs. The petition must be submitted within 30 days of the Regional Water Board's action to the following address:

State Water Resources Control Board
Office of Chief Counsel
P.O. Box 100, 1001 I Street
Sacramento, CA 95812-0100

E. Information and Copying

The RWD, related documents, tentative effluent limitations and special provisions, comments received, and other information are on file and may be inspected at the address above at any time between 8:30 a.m. and 4:45 p.m., Monday through Friday. Copying of documents may be arranged through the Regional Water Board by calling (916) 464-3291.

F. Register of Interested Persons

Any person interested in being placed on the mailing list for information regarding the WDRs and NPDES permit should contact the Regional Water Board, reference this facility, and provide a name, address, and phone number.

G. Additional Information

Requests for additional information or questions regarding this order should be directed to Alexander MacDonald at (916) 464-4625.